Translation

PCT/JP2003/013529

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference FP384PCT	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/013529	International filing date (*day/month/year*) 23 October 2003 (23.10.2003)	Priority date (*day/month/year*)
International Patent Classification (IPC) or national classification and IPC F02M 25/07		
Applicant	HITACHI, LTD.	

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 23 October 2003 (23.10.2003)	Date of completion of this report 20 May 2004 (20.05.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

Form PCT/IPEA/409 (cover sheet) (July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/013529

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed

☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP03/13529

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:

The common matter of claims 1-6 is an exhaust gas recirculation device for an internal combustion engine; they describe an exhaust gas recirculation device for an internal combustion engine that comprises an intake air flow rate detector that detects the flow rate in the intake air passage and a detector that detects the exhaust gas flow rate in the exhaust gas recirculation passage, and that performs feedback control of an intake air control valve and/or an exhaust gas control valve so that an exhaust gas recirculation ratio obtained based on the outputs of both detectors is a target recirculation ratio. But this is disclosed in document JP, 2003-166445, A (ISUZU MOTORS LTD.), 13 June 2003 and document JP, 2001-152916, A (NISSAN MOTOR CO., LTD.), 05 June 2001 and document JP, 10-184408, A (NISSAN MOTOR CO., LTD.), 14 July 1998 and JP, 3303274, B (K.K. YUNISHIA JEKKUSU), 10 May 2002, so this common matter is not a special technical feature in the sense of PCT Rule 13.2, second sentence.

Also, claims 2 and 4 pertain to an exhaust gas recirculation device for an internal combustion engine that controls an intake air control valve and/or an exhaust gas control valve so that an exhaust gas recirculation ratio is a target value; when the target exhaust gas recirculation ratio changes rapidly, it handles sudden change by controlling the intake air control valve and exhaust gas control valve with rapid responsiveness.

Nevertheless, claim 3 pertains to an exhaust gas recirculation device for an internal combustion engine that controls an intake air control valve and/or an exhaust gas control valve so that an exhaust gas recirculation ratio is a target value; it seeks to improve control precision by providing a plurality of three-dimensional maps defined by combinations of exhaust gas control valve opening degree and intake air control valve opening degree and exhaust gas recirculation ratio and selecting a three-dimensional map in response to the driving status.

Also, claim 5 pertains to an exhaust gas recirculation device for an internal combustion engine that controls an intake air control valve and/or an EGR control valve so that an EGR ratio is a target value; it detects the exhaust gas recirculation flow rate by providing a detector that detects the recirculation flow rate based on the pressure difference at least two points in the exhaust gas recirculation passage or a detector that detects the mass flow rate in the exhaust gas recirculation passage.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☐ all parts.

☒ the parts relating to claims Nos. 1, 2, 4.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2, 4	YES
	Claims	1	NO
Inventive step (IS)	Claims		YES
	Claims	1, 2, 4	NO
Industrial applicability (IA)	Claims	1, 2, 4	YES
	Claims		NO

2. Citations and explanations

Document 1: JP, 10-184408, A, 14 July 1998
Document 2: JP, 2003-166445, A, 13 June 2003
Document 3: JP, 54-030319, A, 06 March 1979
Document 4: JP, 2000-008965, A, 11 January 2000
Document 5: JP, 07-083086, A, 28 March 1995

The subject matter of claim 1 is not novel and does not involve an inventive step on account of document 1 and document 2 and document 3 cited in the ISR.

An exhaust gas recirculation device for an internal combustion engine that comprises an intake air flow rate detector that detects the flow rate in the intake air passage and a detector that detects the exhaust gas flow rate in the exhaust gas recirculation passage, and that performs feedback control of an intake air control valve and/or an exhaust gas control valve so that an exhaust gas recirculation ratio obtained based on the outputs of both detectors is a target recirculation ratio is described in documents 1 and 3.

Also, the invention described in claim 1 is essentially no different from the matter described in document 2 except with regard to the means for detecting the exhaust gas flow rate in the exhaust gas recirculation passage.

Providing a detector to detect the exhaust gas flow rate in the exhaust gas recirculation passage as a means of detecting exhaust gas flow rate is presented on page 2, right column, lines 17-50 of document 1 and in the drawings of document 3. Making it a detector to detect the exhaust gas flow rate is merely a simple substitution.

The subject matter of claims 2 and 4 does not involve an inventive step on account of document 1, document 2, document 3, document 4 cited in the ISR, and document 5.

Controlling in the sequence throttle valve and EGR valve when carrying out feedback control of a throttle valve and EGR valve so as to achieve the calculated target throttle valve opening degree and target EGR valve opening degree is taught in Fig. 5 of document 1.

Also, making the responsiveness of the EGR valve slower than that of the throttle valve when it overruns is taught by Fig. 5 of document 4.

Also, when accelerating or decelerating, estimating the delay time to the EGR gas's air intake system via the EGR valve and delaying the throttle valve's drive speed based on this estimated time and driving the EGR at the response speed corresponding to the amount of acceleration or deceleration is taught in document 5, page 2, left column, lines 2~21.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box IV:

Also, claim 6 pertains to an exhaust gas recirculation device for an internal combustion engine that controls an intake air control valve and/or an EGR control valve so that an EGR ratio is a target value. It responds to excessive driving by using an electronic control type throttle actuator as the air intake control valve.

Given the foregoing, there is no common matter in all of the claims, and no common issue addressed by all of the claims. These claims are not so linked as to form a single general inventive concept.

Claims which the international search agency feels satisfy the requirement of unity of invention are as follows.
Claims 1, 2, 4
Claims 1, 3
Claims 1, 5
Claims 1, 6